CLAIMS

1. A plain bearing having a sliding layer of a bearing material thereon, the bearing material comprising a polymer-based matrix selected from the group comprising modified epoxy resin and polyimide/amide resin, the matrix having contained therein at least one addition selected from the group comprising: metal powder in the range from 15 to 30vol%; a fluoropolymer in the range from 1 to 15vol%; ceramic powder in the range from 0.5 to 20vol%; and, silica in the range from 2 to 15vol%.

2. A plain bearing according to claim 1 wherein the modified epoxy resin comprises from 30 to 60w/w epoxy resin and 70 to 40w/w phenolic resin based on solids to solids content.

3. A plain bearing according to either claim 1 or claim 2 wherein the modified epoxy resin also contains an amino resin.

4. A plain bearing according to any one of preceding claims 1 to 3 wherein the modified epoxy resin also contains vinyl resin.

5. A plain bearing according to any one of preceding claims 1 to 4 wherein the modified epoxy resin contains two or more distinct epoxy resin constituents in the initial uncured resin matrix mixture.

6. A plain bearing according to claim 1 wherein polyimide is a majority constituent in the polyimide/amide matrix resin.

7. A plain bearing according to claim 6 wherein the polyimide/amide resin also contains a vinyl resin constituent.

8. A plain bearing wherein the metal powders are selected from the group comprising: tungsten, aluminium,

copper, silver, tin, brass, bronze, stainless steel, nickel.

9. A plain bearing according to any one of preceding claims 1 to 8 wherein the metal powder comprises mixtures of different metal powders in preferred proportions.

10. A plain bearing according to claim 8 wherein the metal powder comprises a mixture of aluminium and tungsten metals in the range between 30/70 and 70/30 Al/W volume%.

11. A plain bearing according to claim 10 wherein the proportions of Al and W powders are 40/60% Al/W by volume.

12. A plain bearing according to either claim 10 or claim 11 wherein the morphology of the W particles is nodular or rounded.

13. A plain bearing according to any one of preceding claims 10 to 12 wherein the Al powder is of flake or leaf-like morphology.

14. A plain bearing according to any one preceding claim wherein the particle size of the metal powder constituent lies in the range from 0.5 to 10μm.

15. A plain bearing according to any one preceding claim from 1 to 9 wherein the metal powder constituent is selected from the group comprising: Al/Sn; Ag/Cu; Cu/W; Ag/W.

16. A plain bearing as claimed in any one preceding claim from 1 to 9 wherein the metal powders comprise metal alloy particles.

17. A plain bearing according to claim 16 wherein the alloys are selected from the group comprising: stainless steel, aluminium alloys, brasses and bronzes.

18. A plain bearing according to any one preceding claim

wherein the fluoropolymer is polytetrafluoroethylene.

19. A plain bearing according to any one preceding claim wherein the fluoropolymer content lies in the range from 1 to 15vol%.

20. A plain bearing according to claim 19 wherein the fluoropolymer content lies in the range from 2 to 8vol%.

21. A plain bearing according to any one preceding claim wherein the ceramic powder is selected from the group comprising: oxides, nitrides, carbides, silicates and sulphides.

22. A plain bearing according to any one preceding claim wherein the ceramic content lies in the range from 2 to 20vol%.

23. A plain bearing according to any one preceding claim wherein the silica content lies in the range from 4 to 10vol%.

24. A plain bearing according to any one preceding claim wherein the particle size lies in the range from 20 to 50 nanometres.

25. A plain bearing according to any one preceding claim wherein the silica is reactive silica and possesses "-OH" groups associated with the particle surface.

26. A plain bearing according to any one preceding claim wherein the total addition of solids content to the polymer matrix does not exceed 35vol%.

27. A plain bearing according to claim 26 wherein the total solids content of additions to the matrix may lie in the range from 10 to 30vol%.

28. A plain bearing according to any one preceding claim further including a silane material in the range of 0.2 to 3vol%.

29. A plain bearing according to claim 28 wherein the silane material is selected from the group comprising:

bis-(gamma-trimethoxysilylpropyl)amine and gamma-glycidoxypropyltrimethoxysilane.

30. A plain bearing according to any one preceding claim wherein the polymer based bearing material is deposited upon a layer of another bearing material.

31. A plain bearing according to claim 30 wherein the other bearing material is selected from an aluminium alloy or a copper alloy.

32. A plain bearing according to either claim 30 or claim 31 wherein a thickness of the polymer based bearing material lies in the range from 5 to 40μm.

33. A plain bearing according to any one preceding claim from 1 to 29 wherein the polymer based bearing material is deposited directly upon a strong backing material.

34. A plain bearing according to claim 33 wherein a thickness of the polymer based bearing material lies in the range from 40 to 100μm.

35. A plain bearing according to any one preceding claim wherein the polymer based bearing material is applied as a liquid to the substrate.

36. A plain bearing according to claim 35 wherein the liquid is sprayed.

bis-(gamma-trimethoxysilylpropyl)amine and gamma-glycidoxypropyltrimethoxysilane.

30. A plain bearing according to any one preceding claim wherein the polymer based bearing material is deposited upon a layer of another bearing material.

31. A plain bearing according to claim 30 wherein the other bearing material is selected from an aluminium alloy or a copper alloy.

32. A plain bearing according to either claim 30 or claim 31 wherein a thickness of the polymer based bearing material lies in the range from 5 to 40μm.

33. A plain bearing according to any one preceding claim from 1 to 29 wherein the polymer based bearing material is deposited directly upon a strong backing material.

34. A plain bearing according to claim 33 wherein a thickness of the polymer based bearing material lies in the range from 40 to 100μm.

35. A plain bearing according to any one preceding claim wherein the polymer based bearing material is applied as a liquid to the substrate.

36. A plain bearing according to claim 35 wherein the liquid is sprayed.